

STATE OF SOUTH CAROLINA**In the Matter of****Application of Duke Energy Carolinas, LLC for
Approval of Decision to Incur
Nuclear Generation Pre-Construction Costs****BEFORE THE
PUBLIC SERVICE COMMISSION
OF SOUTH CAROLINA****COVER SHEET****DOCKET
NUMBER: 2007-440-E**

(Please type or print)

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DOCKETING INFORMATION (Check all that apply)

- ☐ **Emergency Relief demanded in petition** ☐ **Request for item to be placed on Commission's Agenda expeditiously**
- ☒ **Other: Direct Testimony of Dhiaa Jamil**

INDUSTRY (Check one)	NATURE OF ACTION (Check all that apply)		
<input checked="" type="checkbox"/> Electric	<input type="checkbox"/> Affidavit	<input type="checkbox"/> Letter	<input type="checkbox"/> Request
<input type="checkbox"/> Electric/Gas	<input type="checkbox"/> Agreement	<input type="checkbox"/> Memorandum	<input type="checkbox"/> Request for Certificatio
<input type="checkbox"/> Electric/Telecommunications	<input type="checkbox"/> Answer	<input type="checkbox"/> Motion	<input type="checkbox"/> Request for Investigator
<input type="checkbox"/> Electric/Water	<input type="checkbox"/> Appellate Review	<input type="checkbox"/> Objection	<input type="checkbox"/> Resale Agreement
<input type="checkbox"/> Electric/Water/Telecom.	<input type="checkbox"/> Application	<input type="checkbox"/> Petition	<input type="checkbox"/> Resale Amendment
<input type="checkbox"/> Electric/Water/Sewer	<input type="checkbox"/> Brief	<input type="checkbox"/> Petition for Reconsideration	<input type="checkbox"/> Reservation Letter
<input type="checkbox"/> Gas	<input type="checkbox"/> Certificate	<input type="checkbox"/> Petition for Rulemaking	<input type="checkbox"/> Response
<input type="checkbox"/> Railroad	<input type="checkbox"/> Comments	<input type="checkbox"/> Petition for Rule to Show Cause	<input type="checkbox"/> Response to Discovery
<input type="checkbox"/> Sewer	<input type="checkbox"/> Complaint	<input type="checkbox"/> Petition to Intervene	<input type="checkbox"/> Return to Petition
<input type="checkbox"/> Telecommunications	<input type="checkbox"/> Consent Order	<input type="checkbox"/> Petition to Intervene Out of Time	<input type="checkbox"/> Stipulation
<input type="checkbox"/> Transportation	<input type="checkbox"/> Discovery	<input type="checkbox"/> Prefiled Testimony	<input type="checkbox"/> Subpoena
<input type="checkbox"/> Water	<input type="checkbox"/> Exhibit	<input type="checkbox"/> Promotion	<input type="checkbox"/> Tariff
<input type="checkbox"/> Water/Sewer	<input type="checkbox"/> Expedited Consideration	<input type="checkbox"/> Proposed Order	<input checked="" type="checkbox"/> Other:
<input type="checkbox"/> Administrative Matter	<input type="checkbox"/> Interconnection Agreement	<input type="checkbox"/> Protest	
<input type="checkbox"/> Other:	<input type="checkbox"/> Interconnection Amendment	<input type="checkbox"/> Publisher's Affidavit	
	<input type="checkbox"/> Late-Filed Exhibit	<input type="checkbox"/> Report	

BEFORE THE SOUTH CAROLINA PUBLIC SERVICE COMMISSION

DOCKET NO. 2007-440-E

Application of Duke Energy Carolinas, LLC for)
Approval of Decision to Incur)
Nuclear Generation Pre-Construction Costs)

DIRECT TESTIMONY OF
DHIAA M. JAMIL FOR
DUKE ENERGY CAROLINAS

1 **Q. PLEASE STATE YOUR NAME, ADDRESS, AND POSITION.**

2 A. My name is Dhiaa M. Jamil. My business address is 526 South Church Street,
3 Charlotte, North Carolina. I am Group Executive and Chief Nuclear Officer for
4 Duke Energy Carolinas, LLC (“Duke Energy Carolinas” or the “Company”).

5 **Q. WHAT ARE YOUR PRESENT RESPONSIBILITIES AT DUKE ENERGY**
6 **CAROLINAS?**

7 A. As Group Executive and Chief Nuclear Officer, I am responsible for the safe and
8 efficient operation of the Company’s three nuclear generating stations, McGuire,
9 Oconee, and Catawba nuclear stations.

10 **Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND**
11 **PROFESSIONAL EXPERIENCE.**

12 A. I graduated from the University of North Carolina at Charlotte with a Bachelor of
13 Science degree in electrical engineering. I am a professional engineer in South
14 Carolina and North Carolina, and have completed the Institute of Nuclear Power
15 Operations’ (“INPO”) senior nuclear plant management course and received my
16 Duke Energy technical nuclear certification. I served as a senior member of the
17 Institute of Electrical & Electronics Engineers (“IEEE”) and recently completed a
18 three-year assignment as a member of the Council of the National Academy for
19 Nuclear Training. I was also a member of the Dominion Energy Management
20 Safety Review Advisory Committee, the TVA Nuclear Safety Review Board, the
21 PGE Nuclear Safety Review Board, and served on the York County Chamber of
22 Commerce board of directors. I am currently a member of the Charlotte Research
23 Institute Board of Directors, Electric Power Research Institute, Executive Council

1 Nuclear Power, the INPO Executive Advisory Group, and the Nuclear Energy
2 Institute Nuclear Strategic Issues Advisory Committee.

3 I began my career at Duke Energy Carolinas in 1981 as a design engineer in
4 the design engineering department. After a series of promotions, I was named
5 Oconee Nuclear Station electrical systems engineering supervisor in 1989; electrical
6 engineering manager in 1994; maintenance superintendent, McGuire Nuclear
7 Station in 1997; station manager of McGuire in September 1999; and vice president
8 of McGuire Nuclear Site in September 2002. I was named vice president of
9 Catawba Nuclear Station in July 2003 with responsibility for all aspects of the safe
10 and efficient operation of the nuclear site. In December 2006 I was named senior
11 vice president of nuclear support, and I was named to my current role in February
12 2008.

13 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS**
14 **PROCEEDING?**

15 A. The purpose of my testimony is to discuss the development work performed and
16 costs incurred to date by Duke Energy Carolinas for the William States Lee, III
17 Nuclear Station ("Lee Nuclear Station"), as well as to describe the anticipated
18 development work and costs to be incurred during the period January 1, 2008
19 through December 31, 2009. I also provide background regarding Duke Energy
20 Carolinas' current nuclear fleet and operations and discuss the general status of the
21 development of new nuclear generation in the United States.

22 **Q. PLEASE DESCRIBE DUKE ENERGY CAROLINAS' EXISTING**
23 **NUCLEAR GENERATION PORTFOLIO.**

1 A. Duke Energy Carolinas' nuclear generation portfolio consists of approximately
2 7,000 MWs of generating capacity (6,996 MWs operated; 5,020 MWs owned) from
3 three generating stations with seven generation units. Oconee Nuclear Station,
4 located in Oconee County, South Carolina, began commercial operation in 1973 and
5 was the first nuclear station designed, built and operated by Duke Energy Carolinas.
6 McGuire Nuclear Station, located in Mecklenburg County, North Carolina began
7 commercial operation in 1981. Duke Energy Carolinas jointly owns the Catawba
8 Nuclear Station, located on Lake Wylie in York County, South Carolina, with North
9 Carolina Municipal Power Agency Number One ("NCMPA"), North Carolina
10 Electric Membership Corporation ("NCEMC"), Piedmont Municipal Power Agency
11 ("PMPA") and Saluda River Electric Cooperative, Inc. ("Saluda River").

12 **Q. PLEASE DISCUSS DUKE ENERGY CAROLINAS' NUCLEAR**
13 **OPERATIONAL PERFORMANCE.**

14 A. The Company has been a leader in nuclear performance. Duke Energy Carolinas is
15 not alone in its excellence, as all U.S. nuclear operations have continued on a steady
16 pace of improvements. Operating costs for the Company's nuclear fleet are among
17 the lowest in the nation. Over the course of the nuclear fleet's operation, the
18 Company's nuclear performance has improved dramatically. In particular, shorter
19 refueling outages and improved forced outage rates have contributed to increasing
20 the capacity factors achieved by the Company's nuclear fleet.

21 For example, 2007 was an exemplary year for the performance of Duke
22 Energy Carolinas' nuclear units. The nuclear system capacity factor for 2007 was
23 92.36%, the third highest in history of the fleet, and three of the seven units set

1 individual capacity factor records. During the summer of 2007, our nuclear fleet
2 set a system record of 107 continuous days on line. Individual units also recorded
3 significant continuous run milestones in 2007, with Oconee 3 completing a record
4 continuous run of 432 days, McGuire 1 completing its second-longest continuous
5 run of 446 days, and Catawba 2 also completing its second-longest continuous run
6 of 475 days. This operational experience will serve us well during the
7 development and operation of the Lee Nuclear Station.

8 **Q. IN GENERAL, WHAT IS THE CURRENT STATUS OF NEW NUCLEAR**
9 **GENERATION IN THE UNITED STATES?**

10 A. Nuclear generation is undergoing a revival; according to NEI data, between 15 and
11 20 new nuclear projects are planned across the United States by 2020. This renewed
12 interest is attributable to several factors, including (a) a need for new base load
13 generation capacity over the next decade in many areas of the country, most notably
14 in the Southeast; (b) recognition, both internationally and domestically, in the
15 environmental benefits of nuclear generation as the focus on air emissions
16 heightens, particularly as climate change regulation receives greater consideration;
17 (c) the need for American business and industry, for whom the price of electricity
18 can be a significant component of overall operating costs, to remain competitive in
19 global markets as other countries maintain or even increase their reliance on nuclear
20 generation; (d) rising and often volatile prices associated with the fuels used in fossil
21 generation assets, particularly natural gas but also coal; and (e) increasing concerns
22 about our nation's energy security and energy independence. This interest has
23 evolved into planned projects as the result of the demonstrated safe, reliable, and

1 economical operation of the current fleet of nuclear power plants over the past two
2 decades, both in the U.S. and world wide.

3 While all of these factors have led many utilities to announce new nuclear
4 projects over the past couple of years, significant financial, regulatory, and technical
5 challenges remain to be resolved. As a result, we have seen new federal and state
6 legislation, including new laws in South Carolina and North Carolina that encourage
7 the development of new nuclear generation. The prior nuclear construction period
8 existed under a regulatory process where safety reviews were performed by the
9 Nuclear Regulatory Commission ("NRC") while the facility was under construction.
10 Additionally, each power station was designed individually, with only limited
11 standardization employed, and operating experience from deployment of this new
12 technology was factored continually into the review process. These factors all
13 contributed to project cost and schedule uncertainty.

14 Today, standardized designs are being proposed for deployment and the
15 nuclear regulatory review and approval process has been changed to provide for
16 completion of the safety reviews before substantial construction is authorized. Both
17 the standard designs and the review standards have incorporated the lessons learned
18 from operation of the current fleet of over one hundred nuclear power units in this
19 country. The combination of these changes should logically lead to a much higher
20 level of predictability of project cost and schedule; however, this assumption has not
21 yet been demonstrated.

22 The key to making this new approach successful will be the quality planning
23 and preparation that is performed in advance of beginning substantial construction,

1 thus necessitating the need to incur significant development costs to assure project
2 success.

3 **Q. PLEASE DESCRIBE THE PROPOSED LEE NUCLEAR STATION.**

4 A. The Lee Nuclear Station would be constructed in Cherokee County, South Carolina,
5 at the Company's former Cherokee Nuclear Station site. Duke Energy Carolinas has
6 selected the Westinghouse AP1000 reactor technology, which is an advanced
7 nuclear power generation technology that uses the forces of nature and simplicity of
8 design to enhance plant safety and operations, and reduce construction costs. The
9 plant utilizes the best components of currently deployed technologies, providing a
10 high confidence that the facility will operate at high levels of safety and reliability.
11 Each unit has a generation capacity of 1,117 MW, and the projected annual capacity
12 factor of the Lee Nuclear Station is expected to exceed 90% based upon current
13 Duke Energy Carolinas nuclear fleet performance.

14 **Q. PLEASE DESCRIBE THE DEVELOPMENT ACTIVITIES AND**
15 **ASSOCIATED COSTS INCURRED BY DUKE ENERGY CAROLINAS**
16 **THROUGH DECEMBER 31, 2007.**

17 A. Duke Energy Carolinas incurred pre-construction costs of \$69.6 million, including
18 \$8.3 million in accruals, through December 31, 2007. This development work
19 consists of the following:

20 **COLA Preparation** – includes Duke Energy Carolinas' labor, expenses, and
21 contract support for preparation of the Combined Construction and Operating
22 License (COL) Application submitted to the Nuclear Regulatory Commission on

1 December 13, 2007. It also includes the activity of selecting the plant technology
2 and the cost of community involvement activities.

3 **Land and Right-of-Way Purchases** – includes the purchase of land associated
4 with the Cherokee site and the initial purchase of rail right-of-way.

5 **Site Restoration and Development** – includes site remediation, ongoing
6 demolition of existing site structures, planning for site infrastructure, e.g. rail, water,
7 and sewer services, and general site maintenance.

8 **Engineering and Construction Planning** – includes costs associated with the
9 preliminary engineering and construction planning required to establish a firm cost
10 and schedule as necessary before entering into an engineering, procurement, and
11 construction agreement; plus additional engineering and planning necessary to
12 support overall project schedule.

13 **Q. PLEASE DESCRIBE THE ANTICIPATED DEVELOPMENT ACTIVITIES**
14 **AND ASSOCIATED COSTS FOR THE PERIOD JANUARY 1, 2008**
15 **THROUGH DECEMBER 31, 2009.**

16 A. The following general categories of pre-construction work are anticipated during
17 calendar years 2008 and 2009 to continue the development of the Lee Nuclear
18 Station:

19 **NRC Review and hearings**, which include all estimated costs associated with NRC
20 Review Fees; costs required to answer NRC data requests regarding the COLA, and
21 associated legal fees.

22 **Land and Right of Way Purchases**, which include the cost of acquiring land for
23 the site as well as land for transmission and railroad right of ways.

1 **Site Preparation**, which includes costs associated with completing remaining
2 demolition of structures previously constructed as part of the prior Cherokee
3 Nuclear Facility. This category also includes costs associated with ongoing
4 industrial security; utilities; miscellaneous minor site maintenance; and funds
5 required by the Department of Homeland Security for nuclear power plant licensees
6 and applicants. Also included are costs associated with designing rail, water, and
7 sewer upgrades for the facility prior to the point of awarding bids to contractors.

8 **Project Planning and Engineering**, which includes costs associated with
9 developing an engineering, procurement, and construction contract with
10 Westinghouse Electric Corporation - Shaw Stone and Webster ("Westinghouse/
11 Shaw"), the consortium delivering the AP 1000 nuclear units. This category of
12 costs also covers site-specific engineering; construction planning; and some limited
13 initial payments on long-lead material and equipment items such as: Reactor
14 Coolant Pumps, Containment Vessel, Reactor Pressure Vessel, Steam Generators,
15 Control Rod Drive Mechanisms, and Condenser Circulating Water Piping.

16 Duke Energy Carolinas anticipates spending up to \$160 million for this
17 necessary pre-construction work for the period January 1, 2008 through December
18 31, 2009. This estimate is based upon the best information available to Duke
19 Energy Carolinas at this time. Westinghouse/Shaw provided updated, detailed cost
20 information in mid-December 2007 for the design and construction portion of the
21 project. Duke Energy Carolinas is currently evaluating the revised
22 Westinghouse/Shaw information, as well as the design, engineering and
23 construction costs of the project which will be borne directly by the Company

1 (e.g., transmission line upgrades, railroad right-of-way), rather than through the
2 EPC contract with Westinghouse/Shaw. In addition to the Company's internal
3 evaluation, an independent assessment of the cost information is planned. Duke
4 Energy Carolinas anticipates that this work to review the cost information will
5 take several months. As the information is refined during the development
6 process, we expect the overall cost estimate to increase. The timing of receipt of a
7 Certificate of Environmental Compatibility and Public Convenience and Necessity
8 ("CPCN") from the Commission for the Lee Nuclear Station would also affect
9 whether certain costs are considered to be pre-construction or construction-related
10 from a regulatory perspective. As with any major project, Duke Energy Carolinas
11 anticipates updating its estimate and schedule periodically, and will update the
12 Commission accordingly.

13 **Q. WHY DOES DUKE ENERGY CAROLINAS SEEKING APPROVAL OF**
14 **THE PRUDENCE OF THE DECISION TO INCUR OBLIGATIONS**
15 **RELATED TO LONG LEAD PROCUREMENT ITEMS?**

16 A. Duke Energy Carolinas believes that payments required to ensure the timely
17 fabrication and delivery of long-lead procurement items such as Reactor Coolant
18 Pumps, Containment Vessel, Reactor Pressure Vessel, Steam Generators, Control
19 Rod Drive Mechanisms, and Condenser Circulating Water Piping are prudent and
20 constitute "pre-construction costs" because such payments are required "pre-
21 construction" obligations to ensure that the Lee Nuclear Station can remain an
22 option for commercial operation in the 2018 timeframe. The Company does not
23 currently know with precision which items would require long-lead procurement

1 decisions, how far in advance those decisions would have to be made, or the amount
2 or timing of advance obligations that would be required to secure and maintain a
3 place in the fabrication queue for those items. However, our cost estimate and
4 development schedule anticipates the Reactor Coolant Pumps, Containment Vessel,
5 Reactor Pressure Vessel, Steam Generators, Control Rod Drive Mechanisms
6 Condenser Circulating Water Piping, plus numerous other power plant components
7 will need to be ordered and certain advance payments made well before on-site
8 construction activity actually commences on the project.

9 **Q. WHY DOES THE COMPANY'S APPLICATION SEEK APPROVAL FOR**
10 **DEVELOPMENT COSTS TO BE INCURRED THROUGH 2009?**

11 A. In order to continue to preserve the option to have the Lee Nuclear Station available
12 to serve customers in the 2018 timeframe, the Company must continue its
13 development efforts without interruption or delay. As I have already discussed,
14 Duke Energy Carolinas has significant development work planned over the next two
15 years. A great deal of the development work planned for 2009 is an extension of the
16 work commenced in 2008. Because the Company is uncertain as to what point the
17 activities will transition from "development" to "construction" (following receipt of
18 the CPCN from the Commission), Commission approval now to incur development
19 costs through 2009 will be more efficient and reduce the likelihood of possible delay
20 or interruption.

21 **Q. WHY DO THE DEVELOPMENT PLANS INCLUDE TWO UNITS AT THE**
22 **LEE NUCLEAR STATION?**

1 A. As Company witness Janice Hager discusses in her testimony, the 2007 Annual Plan
2 includes one new nuclear unit in 2018 in the selected resource plan for the Base
3 Reference Case and Carbon Reference Case, but the action plan calls for pursuing
4 licensing of two new units over the planning horizon because of uncertainty
5 associated with future carbon regulation. There is no material increase in costs for
6 obtaining a Combined Construction and Operating License for two units rather than
7 a single unit; seeking a license for a single unit, then separately pursuing a license
8 for a second unit would result in incurring unnecessary costs. There are two aspects
9 to the license application review process: a safety review and an environmental
10 impact review. Since the two proposed units are identical, the safety review for both
11 units simultaneously is not materially more complex than the review for a single
12 unit. The environmental impact review is more comprehensive when it is
13 performed for all potential units at the site rather than assessing the impact of each
14 unit separately and independently. The pre-construction costs are largely
15 independent of whether one or two units ultimately are constructed. The referenced
16 \$230 million in development costs through 2009 does not include any Unit 2-
17 specific costs. Planning for two units at this stage preserves the option should
18 carbon regulation or other changes develop in the next few years, and accordingly,
19 Duke Energy Carolinas is seeking approval of its decision to continue the
20 development for both units of the Lee Nuclear Station.

21 **Q. DOES THE COMPANY RETAIN FLEXIBILITY TO ADJUST THE**
22 **DEVELOPMENT PLANS FOR THE LEE NUCLEAR STATION?**

1 A. Yes. As we continue the development process and gain additional information from
2 the Westinghouse/Shaw consortium as to cost and delivery estimates, as well as
3 update the annual integrated resource planning analysis, Duke Energy Carolinas can
4 modify the development plans accordingly. However, at this time, we believe it is
5 prudent to incur the development costs set forth in the Company's application to
6 continue to preserve the Lee Nuclear Station as an option to serve our customers'
7 needs in the 2018 timeframe.

8 **Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?**

9 A. Yes, it does.